Cabling Summary

Introduction

This appendix provides details on the cabling required to connect customer devices to an IGX node. In all cable references, the transmit direction is *from* the node, and receive is *to* the node.

Note EIA/TIA-232 and EIA/TIA-449 existed as recommended standards RS-232 and RS-449 before the Electronics Industries Association (EIA) and Telecommunications Industry Association (TIA) accepted them as standards.

UXM-E Cabling

The cabling for the UXM-E appears in Table C-1.

Table C-1 UXM-E Cable Model Numbers and Descriptions

Model Number	Description
CAB-SMF-Y-SC	Single mode fiber Y-cable with SC male connectors
CAB-T3E3-PL-Y	SMB-BNC Y-cable, Posi-Lok SMB female connector on Y end and BNC female connector on tail end
CAB-T3E3-PL-Y-6	Bundle of 6 SMB-BNC Y-cable
CAB-T3E3-PL-Y-12	Bundle of 12 SMB-BNC Y-cable
CAB-SMF-SC-x	Standard single mode fiber cable with SC male connectors, x ft = 10, 25, 50, 75, 100
CAB-MMF-SC-x	Standard Multi Mode Fiber cable with SC male connectors, x ft = 10, 25, 50, 75, 100
CAB-T3E3-PL-AD	SMB-BNC adaptor cable 72 inch
CAB-T3E3-PL-AD-6	Bundle of 6 SMB-to-BNC adaptor cable
CAB-T3E3-PL-AD-12	Bundle of 12 SMB-to-BNC adaptor cable
CAB-5607-10=	DB-15/Y Cable/M15-F15 10 Feet
CAB-5614-x	T1/M15-M15 Xover, x ft = 10, 25, 50, 75, 100
CAB-5616-x	T1/M15-M15, x ft = 10, 25, 50, 75, 100
CAB-5685-10=	E1/Y Cable 10 Feet

T1 Cabling

Trunk cables connect the customer DSX-1 crossconnect point or T1-E1 Channel Service Unit (CSU) to the IGX node at the BC-T1 or BC-E1 back card. Refer to Table C-2 for details.

Table C-2 T1 Trunk/Circuit Line Cabling Specification

Cable Parameter	Description
Cable Type:	Western Electric 22 AWG, ABAM individually shielded twisted pair. Two pair per T1 line (1 transmit and 1 receive).
Cable Connector:	Male DB-15 subminiature. See Table C-3 for pinouts. The connector pinouts are the same for both the BA-T1 and the MT3 Distribution Panel.
Maximum Cable Length:	533 ft (162 m.) maximum between the node and the first repeater or CSU.

Table C-3 T1 Connector Pin Assignments

Pin No.	Description
1	Transmit, Tip
2	Transmit Pair Shield
3	Receive, Tip
4	Receive Pair Shield
9	Transmit, Ring
11	Receive, Ring

E1 Cabling

E1 trunk cables connect the customer DSX-1 crossconnect point or E1 Channel Service Unit (CSU) to the node at the back card. Note that variations exist in the pin assignments for some interfaces: Table C-6 and Table C-7 show the D-connector pinouts for the CVM, NTM, UFM, UVM, and FRM.

Table C-4 E1 Trunk/Circuit Line Cabling Specification

Cable Parameter	Description
Cable Type:	75-ohm coaxial cable for balanced line or 100–120-ohm twisted pair for unbalanced line. Balanced lines use two cables per E1 port.
Cable Connector:	Two female BNC for balanced connection; male DB-15 for unbalanced connection. See Table C-5, Table C-6, and Table C-7 for pinouts.
Max. Cable Length:	E1 output complies with G.703, so attenuation must not exceed –6dB at 1024 kHz (applies to 75 ohm coax or 120 ohm twisted pair). Maximum length is 100 meters between the IGX node and the first repeater or CSU.

Table C-5 E1 Connector Pin Assignments (Balanced)

Connector	Description
Rx BNC	Receive E1 from trunk
Tx BNC	Transmit E1 to trunk

Table C-6 E1 D-Connector Pinout, CVM and NTM Back Cards

Pin No.	Description
1	Receive, Tip
2	Receive Pair Shield
3	Transmit, Tip
9	Receive, Ring
10	Transmit Pair Shield
11	Transmit, Ring

Table C-7 E1 D-Connector Pinout, FRM, UFM, and UVM Back Cards

Pin No.	Description
1	Transmit, Tip
2	Transmit Pair Shield
3	Receive, Tip
4	Receive Pair Shield
9	Transmit, Ring
11	Receive, Ring

TTC JJ-20 (J1) Cabling

Table C-8 and Table C-9 describes the J1 cabling and the TTC connector pinouts, respectively.

Table C-8 Japanese J1 Cabling

Cable Parameter	Description
Cable Type:	110-ohm, twisted pair for balanced; 2 cable pairs (1 transmit, 1 receive) per TTC.
Cable Connection:	Male DB-15 for balanced connection. See Table C-9 for pinouts.
Max. Cable Length:	Maximum length depends on signal attenuation, which cannot exceed 13 dB.

Table C-9 TTC Connector Pin Assignments (Balanced)

Pin No.	Description
2	Send Tip S(T)
9	Send Ring S(R)
4	Receive Tip R(T)
11	Receive Ring R(R)
1	Ground

Y1 Trunk Cabling

Table C-10 and Table C-11 describe the Y1 cable and the connector pin assignments, respectively.

Table C-10 Japanese Y1 Cabling

Pin No.	Description
Cable Type:	110 ohm twisted pair, balanced operation. Two cable pairs (1 transmit, 1 receive) per Y1 line.
Cable Connection:	Male DB-15. See Table C-11 for pinouts.
Max. Cable Length:	Maximum cable length is determined by Vp-p (Voltage peak-to-peak). The maximum permissible value is 1 Vp-p.

Table C-11 Y Trunk Connector Pin Assignments (Balanced)

Pin No.	Description
2	Transmit Tip T(A)
9	Transmit Ring T(B)
4	Receive Tip R(A)
11	Receive Ring R(B)
1	Shield

Subrate (SR) Cabling

This section lists general data for the subrate cabling and the pinouts for different types of interfaces that support subrate operation. Table C-12 contains general specifications for the subrate cabling. Table C-13, Table C-14, and Table C-15 list the pinouts for V.11, V.35, and EIA/TIA-449 interfaces, respectively.

Table C-12 Subrate Trunk Cabling Specification

Cable Parameter	Description
Cable Type:	100–120-ohm twisted pair telephone cable.
Cable Connector:	V.11, DB-15 subminiature, male. V.35, 34 pin M block (Winchester), male. MIL188/RS-449, DB-37 subminiature, male. See Table C-13 through Table C-15 for pinouts.
Max. Cable Length:	Depends on operating speed. Ranges are 400 meters for 256 Kbps though 50 meters for 1.92 Mbps.

Table C-13 SR Connector Pin Assignments (V.11)

Pin No.	Description
1	Shield ground
2	TX-A
9	TX-B
3	CA
10	CB
4	RX-A
11	RX-B
5	IA
12	IB
6	SA
13	SB
7	not used
8	Signal ground
14	not used
15	not used

Table C-14 SR Connector Pin Assignments (V.35)

Pin No.	Name	Source	Description
A	Gnd.	both	Protective (Shield) ground
B	Sig. Gnd.	both	Signal ground
C	RTS	DTE	Request to Send
D	CTS	DCE	Clear to Send
E	DSR	DCE	Data Set Ready
F	DCD	DCE	Data Carrier Detect (RLSD)
H	DTR	DTE	Data Terminal Ready
J	RI	DCE	Ring Indicator
K	TM	DCE	Test Mode
L-N			not used
P/S	TxD	DTE	Transmit Data from DTE
R/T	RxD	DCE	Received Data to DTE
U/W	XTC	DTE	External Transmitter Clock
V/X	RxC	DCE	Receiver Clock
Y/AA	TxC	DCE	Transmitter Clock
BB-EE			not used

Table C-15 SR Connector Pin Assignments (EIA/TIA-449)

Pin No.	IGX Name	EIA Name	Source	Description
1	Frm. Gnd.		Both	Shield Ground
2	SI	SI	DCE	Signaling Rate Indicator (to DTE)
4/22	TxD	SD	DTE	Transmit Data from DTE
5/23	TxC	ST	DCE	Transmitter Clock
6/24	RxD	RD	DCE	Received Data to DTE
7/25	RTS	RS	DTE	Request to Send
8/26	RxC	RT	DCE	Receiver Clock
9/27	CTS	CS	DCE	Clear to Send
10	LL	LL	DTE	Local Loopback
11/29	DSR	DM	DCE	Data Set Ready
12/30	DTR	TR	DTE	Data Terminal Ready
13/31	DCD	RR	DCE	Data Carrier Detect (RLSD)
14	RL	RL	DTE	Remote Loopback
15	RI	IC	DCE	Ring Indicator
16	SF	SF	DTE	Signal Rate Select (to DCE)
17/35	XTC	TT	DTE	External Transmitter Clock
18	TM	TM	DCE	Test Mode
19	Sig. Gnd.	SG	Both	Signal Ground
20		RC	DCE	Receive Common
28	BSY	IS	DTE	Busy (in service)
32	SS	SS	DTE	Select Standby
33	SQ	SQ	DCE	Signal Quality Detect
34	NS	NS	DTE	New Synchronization
36	SB	SB	DCE	Standby Indicator
37		SC	DTE	Send Common
3, 21				Spare

Table C-16 T3 Connector Pin Assignments

Connector	Description
Rx BNC	Receive T3 from trunk
Tx BNC	Transmit T3 to trunk

UFM Cabling

Table C-17 lists the cables that can connect to the UFM back cards for synchronous and asynchronous circuits.

Table C-17 UFM Data Cables

Cable Parameter	Description
Cable type:	Standard V.35 or X.21
Cable connectors:	X.21 DTE: DB-60, male (provides two X.21 ports) X.21 DCE: DB-60, male (provides two X.21 ports) V.35 DTE: DB-60, male (provides two V.35 ports) V.35 DCE: DB-60, male (provides two V.35 ports) HSSI: DB-50, male
Maximum cable length:	Not to exceed interface standards

UFI X.21 and V.35 DTE Port Pin Assignments

Table C-18 lists the UFI X.21 and V.35 DTE pin assignments at the DB-60 connector on the card.

Table C-18 UFI X.21 and V.35 DTE Port Pin Assignments

Pin No.	Name	Source	Direction	Description
7/14	SG	Both	—	Signal Ground
9/22	RxC	DCE	Input	Receive Clock
5/18	TxC	DCE	Input	Transmit Clock
3/16	RxD	DCE	Input	Receive Data
2/15	TxD	DTE	Output	Transmit Data
6/19	XTC	DTE	Output	External Transmit Clock
4/17	DTR	DTE	Output	Data Terminal Ready
10/23	DSR	DCE	Input	Data Set Ready
11	RTS	DTE	Output	Request To Send
24	CTS	DCE	Input	Clear To Send
12	LLB	DTE	Output	Local Loopback Command
13	RLB	DTE	Output	Remote Loopback
26	TM	DTE	Output	Test Mode
20	SG	Both	—	Signal Ground
25	DCD	DCE	Input	Data Carrier Detect
1	—	DCE	Input	Port in DCE Mode

UFI X.21 and V.35 DCE Port Pin Assignments

Table C-19 lists the UFI X.21 and V.35 DCE pin assignments at the DB-60 connector on the card.

Table C-19 UFI X.21 and V.35 DCE port Pin Assignments

Pin No.	Name	Source	Direction	Description
7/14	SG	Both	—	Signal Ground
8/21	RxC	DCE	Output	Receive Clock
6/19	TxC	DCE	Output	Transmit Clock
3/16	TxD	DTE	Input	Transmit Data
2/15	RxD	DCE	Output	Receive Data
9/22	XTC	DTE	Input	External Transmit Clock
4/17	DSR	DCE	Output	Data Set Ready
10/23	DTR	DTE	Input	Data Terminal Ready
11	CTS	DCE	Output	Clear To Send
24	RTS	DTE	Input	Request To Send
25	LLB	DTE	Input	Local Loopback Command
26	RLB	DTE	Input	Remote Loopback
13	TM	DTE	Output	Test Mode
20	SG	Both	—	Signal Ground
12	DCD	DCE	Output	Data Carrier Detect
1	—	DTE	Input	Port in DTE Mode

V.35 DCE Female Cable Pin Assignments

Table C-20 lists the V.35 DCE female cable pin assignments.

Table C-20 UFM V.35 DCE Female Cable Pin Assignments

Signal	Pin No. (from J3)	Wire	Pin No. (to J1)	Signal
Signal ground	55/56	Shorting group		Signal ground
Signal ground	50/51	Shorting group		Signal ground
Shield ground	46	Shield	A	Shield ground
v11-TXD	17/18	Twisted Pair #1	T/R	RD
v11-TXCOUT	19/20	Twisted Pair #2	AA/Y	SCT
v11-RXCOUT	21/22	Twisted Pair #3	X/V	SCR
v11-RXCIN	25/26	Twisted Pair #4	W/U	SCTE
v11-RXD	27/28	Twisted Pair #5	S/P	SD
v28-DSR/v28-CTS	34/35	Twisted Pair #6	H/C	DTR/RTS
v28-RTS/v28-DTR	42/43	Twisted Pair #7	D/E	CTS/DSR
v28-LL-DCD/Not used	44/16	Twisted Pair #8	F/B	RLSD/—
v28-DCD-LL/Not used	33/16	Twisted Pair #9	K/B	LT/Not used
Shield ground	45	Shield	A	Shield ground
v11-TXD	3/4	Twisted Pair #1	T/R	RD
v11-TXCOUT	5/6	Twisted Pair #2	AA/Y	SCT
v11-RXCOUT	7/8	Twisted Pair #3	X/V	SCR
v11-RXCIN	29/30	Twisted Pair #4	W/U	SCTE
v11-RXD	31/32	Twisted Pair #5	S/P	SD
v28-DSR/v28-CTS	38/36	Twisted Pair #6	H/C	DTR/RTS
v28-RTS/v28-DTR	40/41	Twisted Pair #7	D/E	CTS/DSR
v28-LL-DCD/Not used	39/15	Twisted Pair #8	F/B	RLSD/—
v28-DCD-LL/Not used	37/15	Twisted Pair #9	K/B	LT/Not used

Note The CAB-2-V.35 DCE '1' Winchester connector corresponds to an odd UFM-U port and the CAB-2-V.35 DCE '2' Winchester connector corresponds to an even UFM-Uport.

V.35 DTE Male Cable Pin Assignments

Table C-21 lists the V.35 DTE male cable pin assignments.

Table C-21 UFM V.35 DTE Male Cable Pin Assignments

Signal	Pin No. (from J3)	Wire	Pin No. (to J1)	Signal
p2_mode_0/Ground/p2_mode_DCE	55/56/54	Shorting group		
p1_mode_0/Ground/p1_mode_DCE	50/51/52	Shorting group		
Shield ground	46	Shield	A	Shield ground
v11-TXD	17/18	Twisted Pair #1	S/P	SD
v11-TXCOUT	19/20	Twisted Pair #2	W/U	SCTE
v11-TXCIN	23/24	Twisted Pair #3	AA/Y	SCT
v11-RXCIN	25/26	Twisted Pair #4	X/V	SCR
v11-RXD	27/28	Twisted Pair #5	T/R	RD
v28-DSR/v28-CTS	34/35	Twisted Pair #6	E/D	DSR/CTS
v28-RTS/v28-DTR	42/43	Twisted Pair #7	C/H	RTS/DTR
v28-LL-DCD/Not used	44/16	Twisted Pair #8	K/B	LT/—
v28-DCD-LL/Not used	33/16	Twisted Pair #9	F/B	RLSD/Not used
Shield ground	45	Shield	A	Shield ground
v11-TXD	3/4	Twisted Pair #1	S/P	SD
v11-TXCOUT	5/6	Twisted Pair #2	W/U	SCTE
v11-TXCIN	13/14	Twisted Pair #3	AA/Y	SCT
v11-TXCIN/v11-RXCIN	29/30	Twisted Pair #4	X/V	SCR
v11-RXD	31/32	Twisted Pair #5	T/R	RD
v28-DSR/v28-CTS	38/36	Twisted Pair #6	E/D	DSR/CTS
v28-RTS/v28-DTR	42/43	Twisted Pair #7	C/H	RTS/DTR
v28-LL-DCD/Not used	39/15	Twisted Pair #8	K/B	LT/—
v28-DCD-LL/Not used	37/15	Twisted Pair #9	F/B	RLSD/Not used

Note The CAB-2-V.35 DTE '1' Winchester connector corresponds to an odd UFM-U port and the CAB-2-V.35 DTE '2' Winchester connector corresponds to an even UFM-U port.

UFI HSSI Port Pin Assignments

Table C-22 lists the UFI HSSI pin assignments at the DB-50 connector on the card.

Table C-22 UFI HSSI Pin Assignments

Pin No.	Name	Source	Direction	Description
1/26	SG	Both	—	Signal Ground
2/27	RT	DCE	Output	Receive Timing
3/28	CA	DCE	Output	DCE Available
4/29	RD	DCE	Output	Receive Data
5/30	LC	DTE	Output	DCE loop Request
6/31	ST	DCE	Output	Send Timing
7/32	SG	Both	—	Signal Ground
8/33	TA	DTE	Input	DTE Available
9/34	TT	DCE	Input	Terminal Timing
10/35	LA	DTE	Input	Loopback Circuit A
11/36	SD	DTE	Input	Send Data
12/37	LB	DTE	Input	Loopback Circuit B
13/38	SG	Both	—	Signal Ground
14/39	DT	DTE	Input	Send Timing in DTE
15 to 18	—	DCE	Output	Undefined: to DCE
19/44	SG	Both	—	Signal Ground
20 to 23	—	DTE	Input	Undefined: from DCE
24/49	TM	DTE	Output	Test Mode
25/50	SG	Both	—	Signal Ground

The UFI-HSSI interface is native DCE. The interface pin assignment is done in such a way that the UFI interface can be connected to the HSSI interface of a Cisco-Router, which is a native DTE, using a straight pin-to-pin HSSI standard cable attached to a UFI back card or a Cisco Router in either DTE or DCE modes.

A UFI card in DCE mode can be connected to any DTE interface using the same standard Cisco cable.

When UFI is configured in DTE mode, it needs the HSSI-DTE cable to connect to a DCE interface.The wiring details are shown in Table C-23 for cable number 72-1265-01.

Table C-23 UFI HSSI DTE Pin Assignments

Pin No. J1 to J2	Name	Direction	Description
1/26 to 1/26	SG	—	Signal Ground
2/27 to 9/34	RT/TT	Output	Receive Timing/Terminal Timing
3/28 to 8/33	CA/TA	Output	DCE Available/DTE Available
4/29 to 11/36	RD/SD	Output	Receive Data/Send Data
5/30 to 10/35	LC/LA	Output	DCE loop Request/Loopback Circuit A
6/31 to 14/39	ST/DT	Output	Send Timing/Send Timing in DTE
7/32 to 7/32	SG	—	Signal Ground
8/33 to 3/28	TA/CA	Input	DTE Available/DCE Available
9/34 to 2/27	TT/RT	Input	Terminal Timing/Receive Timing
10/35 to 5/30	LA/LC	Input	Loopback Circuit A/DCE loop Request
11/36 to 4/29	SD/RD	Input	Send Data/Receive Data
12/37 to 24/49	LB/TM	Input	Loopback Circuit B/Test Mode
13/38 to 13/38	SG	—	Signal Ground
14/39 to 6/31	DT/ST	Input	Send Timing in DTE/Send Timing
15 through 18 to 40 through 43	not used	—	Not used
19/44 to 19/44	SG	—	Signal Ground
20 through 23 to 45 through 48	not used	—	Not used
24/49 to 12/37	TM/LB	Output	Test Mode/Loopback Circuit B
25/50 to 25/50	SG	—	Signal Ground

FRI V.35 Port Pin Assignments

Table C-24 contains a listing of IGX V.35 pin assignments for the Frame Relay FRI card. A standard V.35 cable is used for this application.

Table C-24 FRI V.35 Port Pin Assignments

Pin No.	Name	Source	Description
A	Gnd.	both	Protective (Shield) ground
B	Sig. Gnd.	both	Signal ground
C	RTS	DTE	Request to Send
D	CTS	DCE	Clear to Send
E	DSR	DCE	Data Set Ready
F	DCD	DCE	Data Carrier Detect
H	DTR	DTE	Data Terminal Ready
L	LLB	DTE	Local Loopback command to user device
N	RLB	DTE	Remote Loopback command to user device
n	TM	DTE	Test Mode indicates user device. ready for test
P/S	TxD	DTE	Transmit Data from DTE
R/T	RxD	DCE	Receive Data to DTE
U/W	XTC	DTE	External Transmitter Clock
V/X	RxC	DCE	Receiver Clock
Y/a	TxC	DCE	Transmitter Clock

Data Cabling

This section contains Table C-25 through Table C-34. These tables describe the cables for the LDM and HDM card sets. (The HDM and LDM are high-speed and low-speed data cards.)

Table C-25 Synchronous Data Cables

Cable Parameter	Description
Cable Type:	Standard EIA/TIA-232C/D (V.24), V.35, or EIA/TIA-449/422 (with adaptor cable for X.21).
Cable Connectors:	EIA/TIA-232C/D (V.24): DB-25 Subminiature, male. V.35: 34 pin M block-type (Winchester), male. EIA/TIA-449/422: DB-37 Subminiature, male.
Max. Cable Length:	Not to exceed interface standards.

HDM EIA/TIA-232D Port Pin Assignments

Table C-26 contains a listing of IGX EIA/TIA-232D port pin assignments for the HDM's interface card—the SDI. A standard EIA/TIA-232 cable works in this application.

Table C-26 HDM EIA/TIA-232D Port Pin Assignments

Pin No.	IGX Name	EIA Name	Source	Description
1	Frame Gnd.	AA	Both	Frame Ground
2	TxD	BA	DTE	Transmit Data from DTE
3	RxD	BB	DCE	Received Data to DTE
4	RTS	CA	DTE	Request to Send
5	CTS	CB	DCE	Clear to Send
6	DSR	CC	DCE	Data Set Ready
7				Signal Ground
8	DCD	CF	DCE	Data Carrier Detect (RLSD)
9	+VS		Both	+12 volt test
10	-VS		Both	–12 volt test
11	QM		DCE	Equalizer Mode (to DTE only)
12	SDCD	SCF	DCE	Secondary Data Carrier Detect
13	SCTS	SCB	DCE	Secondary Clear to Send
14	STxD	SBA	DTE	Secondary Transmit Data
15	TxC	DB	DCE	Transmitter Clock
16	SRxD	SBB	DCE	Secondary Received Data
17	RxC	DD	DCE	Receiver Clock
18	RL		DTE	Remote Loop Back
19	SRTS	SCA	DTE	Secondary Request to Send
20	DTR	CD	DTE	Data Terminal Ready
21	SQ	CG	DCE	Signal Quality Detect
22	RI	CE	DCE	Ring Indicator
23	SF	CH	DTE	Signal Rate Select (to DCE)
23	SI	CI	DCE	Signaling Rate Indicator (to DTE)
24	XTC	DA	DTE	External Transmitter Clock
25	TST		DCE	Test Indicator

HDM EIA/TIA-232C (V.24) Port Pin Assignments

Table C-27 contains a listing of IGX EIA/TIA-232C port pin assignments for the SDI data card. A standard EIA/TIA-232 (V.24) cable is used for this application.

Table C-27 HDM EIA/TIA-232C Port Pin Assignments

Pin No.	IGX Name	EIA Name	Source	Description
1	Frame Gnd.	AA	Both	Frame Ground
2	TxD	BA	DTE	Transmit Data from DTE
3	RxD	BB	DCE	Received Data to DTE
4	RTS	CA	DTE	Request to Send
5	CTS	CB	DCE	Clear to Send
6	DSR	CC	DCE	Data Set Ready
7				Signal Ground
8	DCD	CF	DCE	Data Carrier Detect (RLSD)
9	+VS		Both	+12 volt test
10	-VS		Both	–12 volt test
11	QM Pin 11		DCE DTE	Equalizer Mode (to DTE) Pin 11 to (DCE)
12	SDCD	SCF	DCE	Secondary Data Carrier Detect
13	SCTS	SCB	DCE	Secondary Clear to Send
14	STxD	SBA	DTE	Secondary Transmit Data
15	TxC	DB	DCE	Transmitter Clock
16	SRxD	SBB	DCE	Secondary Received Data
17	RxC	DD	DCE	Receiver Clock
18	DCR		DCE	Divided Receiver Clock
19	SRTS	SCA	DTE	Secondary Request to Send
20	DTR	CD	DTE	Data Terminal Ready
21	SQ	CG	DCE	Signal Quality Detect
22	RI	CE	DCE	Ring Indicator
23	SFCI	CH CI	DTE DCE	Signal Rate Select (to DCE) Signaling Rate Indicator (to DTE)
24	XTC	DA	DTE	External Transmitter Clock
25	BSY		DTE	Busy (in service)

HDM EIA/TIA-449/422 Port Pin Assignments

Table C-28 contains a listing of IGX EIA/TIA-449/422 port pin assignments. A standard EIA/TIA-449 cable is used for this application unless the interface is X.21.

Table C-28 HDM EIA/TIA-449/422 Port Pin Assignments

Pin No.	IGX Name	EIA Name	Source	Description
1			Both	Shield Ground
2	SI	SI	DCE	Signaling Rate Indicator (to DTE)
3				Spare
4/22	TxD	SD	DTE	Transmit Data from DTE
5/23	TxC	ST	DCE	Transmitter Clock
6/24	RxD	RD	DCE	Received Data to DTE
7/25	RTS	RS	DTE	Request to Send
8/26	RxC	RT	DCE	Receiver Clock
9/27	CTS	CS	DCE	Clear to Send
10	LL	LL	DTE	Local Loopback
11/29	DSR	DM	DCE	Data Set Ready
12/30	DTR	TR	DTE	Data Terminal Ready
13/31	DCD	RR	DCE	Data Carrier Detect (RLSD)
14	RL	RL	DTE	Remote Loopback
15	RI	IC	DCE	Ring Indicator
16	SF	SF	DTE	Signal Rate Select (to DCE)
17/35	XTC	TT	DTE	External Transmitter Clock
18	TM	TM	DTE	Test Mode
19		SG	Both	Signal Ground
20		RC	DCE	Receive Common
21				Spare
28	BSY	IS	DTE	Busy (in service)
32	SS	SS	DTE	Select Standby
33	SQ	SQ	DCE	Signal Quality Detect
34	NS	NS	DTE	New Synchronization
36	SB	SB	DCE	Standby Indicator
37		SC	DTE	Send Common

See Table C-29 and Table C-30 for Wire Lists for adapter cables for X.21 application. This adapter cable is available in two models: one is used when the HDM/SDI card set operates as a DCE and the other when the HDM/SDI operates as a DTE. It has a male DB-37 on the IGX end and a female DB-15 (DCE) or male DB-15 (DTE) on the user-end.

Table C-29 Wiring List, SDI EIA/TIA-449-to-X.21 Adapter Cable (for EIA/TIA-449 DCE)

DB-37 Pin No. (SDI)	IGX Name	DB-15 Pin No. (User)	Description
1	Drain	1	Frame Ground
4	TxD-A	2	Transmit Data from DTE
22	TxD-B	9	Transmit Data from DTE
6	RxD-A	4	Receive Data to DTE
24	RxD-B	11	Receive Data to DTE
7	RTS-A	3	Request to Send
25	RTS-B	10	Request to Send
9	CTS-A	5	Clear to Send
27	CTS-A	12	Clear to Send
8	RxC-A	6	Receive Clock
26	RxC-B	13	Receive Clock
19	SG	8	Signal Ground

Table C-30 Wiring List, SDI EIA/TIA-449 to X.21 Adapter Cable (for EIA/TIA-449 DTE)

DB-37 Pin No. (SDI)	IGX Name	DB-15 Pin No. (User)	Description
1	Drain	1	Frame Ground
4	TxD-A	2	Transmit Data from DTE
22	TxD-B	9	Transmit Data from DTE
6	RxD-A	4	Receive Data to DTE
24	RxD-B	11	Receive Data to DTE
7	RTS-A	3	Request to Send
25	RTS-B	10	Request to Send
9	CTS-A	5	Clear to Send
27	CTS-A	12	Clear to Send
5	TxC-A	6	Transmit Clock
23	TxC-B	13	Transmit Clock
19	SG	8	Signal Ground
5 to 8	TxC-A		Receive Clock[1]
23 to 26	TxC-B		Receive Clock *

1. Loops Receive Clock to Transmit Clock when necessary.

HDM V.35 Port Pin Assignments

Table C-31 contains a listing of IGX V.35 Port pin assignments for the SDI card. A standard V.35 cable works this application.

Table C-31 HDM V.35 Port Pin Assignments

Pin No.	Name	Source	Description
A	Gnd.	both	Protective (Shield) ground
B	Sig. Gnd.	both	Signal ground
C	RTS	DTE	Request to Send
D	CTS	DCE	Clear to Send
E	DSR	DCE	Data Set Ready
F	DCD	DCE	Data Carrier Detect (RLSD)
H	DTR	DTE	Data Terminal Ready
J	RI	DCE	Ring Indicator
K	TM	DCE	Test Mode
P/S	TxD	DTE	Transmit Data from DTE
R/T	RxD	DCE	Receive Data to DTE
U/W	XTC	DTE	External Transmitter Clock
V/X	RxC	DCE	Receiver Clock
Y/a	TxC	DCE	Transmitter Clock

LDM EIA/TIA-232 Port Pin Assignments

Table C-32 lists the EIA/TIA-232 port pin assignments at the DB-15 connector on the LDM's LDI back card. The LDM card supports a limited subset of EIA control leads. The LDI always uses a DCE or DTE DB-15-to-DB-25 adapter cable. Refer to Table C-33 and Table C-34 for wiring lists and the pin-outs for the standard male DB-25 connector to the user data device.

Table C-32 LDM EIA/TIA-232 Port Pin Assignments

Pin No.	IGX Name	EIA Name	Source	Description
1	Shield	AA	Both	Frame Ground
2	TxD	BA	DTE	Transmit Data from DTE
3	CTS	CB	DCE	Clear to Send
4	RxD	BB	DCE	Received Data to DTE
5	RTS	CA	DTE	Request to Send
6	XTC	DB	DCE	Transmitter Clock
7	RxC	DD	DCE	Receiver Clock
8	SG	AB	Both	Signal Ground
9	DSR	CC	DCE	Data Set Ready
10	DTR	CD	DTE	Data Terminal Ready
11	+VS		Both	+12V test voltage
12	–VS		Both	–12V test voltage
13	DCD	CF	DCE	Data Carrier Detect (RLSD)
14	RL		DTE	Remote Loop (for modem loopback)
15	MOD			Mode Select for cable (DTE or DCE)

Table C-33 Wiring List, DB-15 to DB-25 Adapter Cable (LDI as DTE)[1]

DB-15 Pin No. (LDI)	IGX Name	DB-25 Pin No. (User)	Description
1	Frm. Gnd.	1	Frame Ground
2	RxD	3	Received Data to DTE
3	RTS	4	Request to Send
4	TxD	2	Transmit Data from DTE
5	CTS	5	Clear to Send
6	XTC	24	External Transmit Clock
7	RxC	17	Receive Clock
8	SG	7	Signal Ground
9	DTR	20	Data Terminal Ready
10	DSR	6	Data Set Ready
11	+VS	9	+12V test voltage [2]
12	–VS	10	–12V test voltage [2]
13	DCD	8	Data Carrier Detect (RLSD)
14	RL	21	Remote Loop output
15	MOD	n.c.	Connects internally to DB-15-8
(3)	LL	18	Local Loop output [3]

1. You can order this cable in lengths of 10 ft., 25 ft., 50 ft., 75 ft., and 100 ft. The Cisco model number is CAB-5626E-xx, where xx is the length, as follows: 10=10 ft.; 25=25 ft.; 50=50 ft.; 75=75 ft., and 00=100 ft.
2. You can use one of these pins to force a control pin to stay high or low.
3. No LDI local loop output is available. Try using DTR output: DB-15-9.

Note Two adapter cables are available for the LDI card. The choice of cable determines whether the LDI card functions as a DCE or as a DTE. These can be ordered from Cisco Systems or made by the customer. Make sure the correct cable is used for the type of user device connected.

Table C-34 Wiring List, DB-15 to DB-25 Adapter Cable (LDI as DCE)[1]

DB-15 Pin No. (LDI)	IGX Name	DB-25 Pin No. (User)	Description
1	Shield	1	Frame Ground
2	TxD	2	Transmit Data from DTE
3	CTS	5	Clear to Send
4	RxD	3	Receive Data to DTE
5	RTS	4	Request to Send
6	RxC	17	Receive Clock, connects to DB-25-15[2]
7	XTC	24	External Transmit Clock
8	SG	7	Signal Ground
9	DSR	6	Data Set Ready
10	DTR	20	Data Terminal Ready
11	+VS	9	+12V test voltage [3]
12	–VS	10	–12V test voltage [3]
13	not connected	not connected	not used
14	DCD	8	Data Carrier Detect (RLSD)
15	MOD	n.c.	Mode Select, no connection for DCE cable
not connected [2]	TxC	15	Transmit Clock, connects to DB-25-17 [2]

1. You can order this cable in lengths of 10 ft., 25 ft., 50 ft., 75 ft., and 100 ft. The Cisco model number is CAB-5625-xx, where xx is the length, as follows: 10=10 ft.; 25=25 ft.; 50=50 ft.; 75=75 ft., and 00=100 ft.
2. Pins 15 and 17 connect through a jumper.
3. You can use one of these pins to force a control pin to stay high or low.

Redundancy Cabling

Table C-35 lists the Y-cables used for redundancy for IGX back cards.

Table C-35 Redundancy Y-Cables

Cable	Used On	Cisco Part No.
EIA/TIA-232C	SDI	5624
EIA/TIA-232D	SDI	5624
EIA/TIA-232	LDI	5629
V.35	SDI	5635
V.35	SDI	special DTE/DCE jumper
EIA/TIA-422/449	SDI	5644
T1	BC-T1	5607
E1	BC-E1	5685

Power Cabling

This section describes AC and DC power cabling between the IGX node and the power source. Source-end connector information is not available for all countries, so local codes must be known or obtained by either the customer or installer. Table C-36 describes AC power cabling. Table C-37 describes DC power cabling.

Table C-36 AC Power Cabling

Piece	Standard
Cable:	Cisco provides a 6-foot (1.8m), 3-conductor cord with an IEC 320 C-19 appliance coupler for mating with the IGX node on the system end. The other end of the power cord should be a grounding-type attachment plug as described in the paragraphs that follow.
Connector:	In North America and Japan: For IGX 8320/8430: NEMA L6-20 Twist Lock For IGX 8410: NEMA L6-20 Twist Lock or NEMA 5-15 For Continental Europe: CEE 7/7 (Schuko) For Italy: CEI 23-16/VII (16 Amp plug) For United Kingdom and Ireland: BS 1363 For Australia and New Zealand: AS 3112 For those countries not appearing in the preceding list, use a power cord with an IEC 320 C-19 appliance coupler for the system-end and an appropriate grounding-type attachment plug at the other end in accordance with local standards.

Table C-37 DC Power Cabling

Piece	Standard
Cable:	You provide a 3-conductor cord. The other end of the power cord should be a grounding-type attachment. The wire gauge is 10 to 12 AWG or 4 sq. mm.
Connector:	At the system end, Cisco provides a pluggable wire block with screw-type clamping for the three conductors. The customer or installer attaches the customer supplied wiring to this block.

SCM Cabling

SCM cabling connects the Network Management ports on the SCM to Cisco WAN Manager (formerly StrataView Plus) Network Management computers, control terminals, and modems. This cabling also provides the connection for an external clock source.

Auxiliary and Control Port Cabling

Interface: The IGX SCM auxiliary and control ports are configured as an EIA/TIA-232 DCE port.

Suggested Cable: 24 AWG, 25-pair. A straight-through EIA/TIA-232 cable is used for a terminal or printer connection. A null modem cable (Figure C-1) is needed when interfacing with modems on either port.

Cable Length: 50 feet (15 m.) maximum.

Cable Connector: DB-25, subminiature, male. Table C-38 contains a list of the port pin assignments.

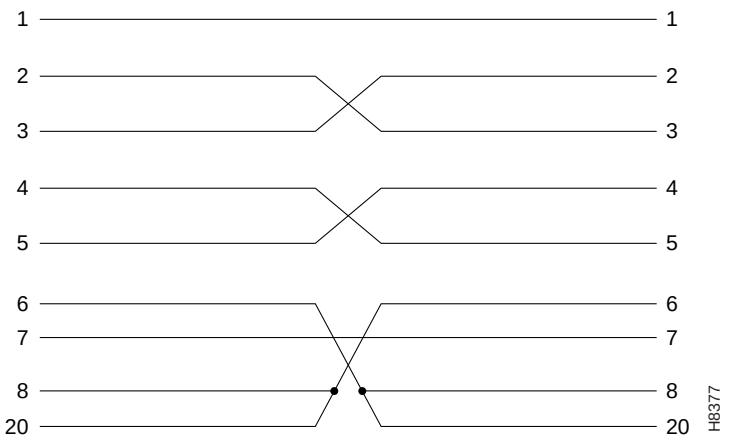
Table C-38 SCM AUX and Control Port Pin Assignments

Pin No.	Name	Source	Description
1	FG	both	Frame Ground
2	TxD	DTE	Transmit Data
3	RxD	DCE	Receive Data
4	RTS	DTE	Request to Send
5	CTS	DCE	Clear to Send
6	DSR	DCE	Data Set Ready
7	SG	both	Signal Ground
8	CD	DCE	Carrier Detect
20	DTR	DTE	Data Term Ready

Null Modem Cable

Figure C-1 shows a null modem cable that connects some of the 1200 and 2400 baud modems to the IGX Control and Auxiliary ports.

Figure C-1 Null Modem Cable



External Clock Input Cabling

Two separate clock inputs exist, and can be used simultaneously on the IGX. They are labelled External-1 and External-2. Both clock inputs require an EIA/TIA 422 balanced square wave signal at either 1.544 or 2.048 MB per second.

Note Standard DS1 or E1 BITS clock sources using AMI bipolar pulse stream signals are not compatible with IGX external clock inputs.

Table C-39 External Clock Cabling

Cable Parameter	Description
Interface	Balanced EIA/TIA 422
Suggested cable	24 AWG, individually shielded, 1- or 2-pair
Cable connector	DB-15, subminiature, male. See Table C-40 for pinouts
Maximum cable length	50 ft (15 m)

Table C-40 External Clock Connector Pin Assignments

Pin No.	Description
1	External Clk 1-A
9	External Clk 1-B
2	Shield ground pair 1
3	External Clk 2-A
11	External Clk 2-B
4	Shield ground pair 1
5	8.192 MHz test output (factory use only)

External Alarm Cabling

This cable connects network alarm outputs to either the DTI Faceplate or the ARI card Alarm connector. Table C-41 lists particulars for the physical interface. Table C-42 lists the pinouts for the network alarm outputs. In Table C-42, note that pins whose names end in “A” are normally open, and pins whose names end in “C” are common.

Table C-41 External Alarm Interface

Parameter	Description
Interface:	Dry-contact relay closure.
Wire:	24 AWG, shielded, 10 pairs.
Connector:	DB-37, Subminiature, male.

Table C-42 Network Alarm Pin Assignments

Pin No.	Name	Description
1	CHASSIS	Chassis Ground
2		Reserved
3	NWMAJA	Network Major Alarm
4	NWMAJC	Network Major Alarm
5		Reserved
6		Reserved
7		Reserved
8		Reserved
9		Reserved
10	MNVISA	Minor Visual Alarm
11		Reserved
12	MNVISC	Minor Visual Alarm
13		Reserved
14		Unused
15		Unused
16	MJAUDC	Major Audible Alarm
17	MJAUDA	Major Audible Alarm
18		Unused
19		Unused
20		Reserved
21		Reserved
22		Reserved
23	NWMINA	Network Minor Alarm
24		Reserved
25	NWMINC	Network Minor Alarm
26		Reserved
27		Reserved
28		Reserved
29	MNAUDA	Minor Audible Alarm
30		Reserved
31	MNAUDC	Minor Audible Alarm
32		Unused
33		Unused
34		Unused
35	MJVISC	Major Visual Alarm
36	MJVISA	Major Visual Alarm
37		Unused

Standard IGX Cables

Table C-43 lists the cables you can order directly from Cisco Systems. The length of the cable appears as a suffix to the model number. For example 5610-50 indicates a 50-foot cable. Cables are generally available in standard lengths of 10 ft (3 m.), 25 ft (7.6 m.), 50 ft (15 m.), 75 ft (22.8 m.) and 100 ft (30 m.) Lengths of 101 ft. (30 m.) to 600 ft. (183 m.) are available on a special order.

Where applicable, Table C-43 indicates the connector gender (male-female) as well as the number of pins. For example T1/M15-M15 indicates a cable terminated with a male DB-15 at both ends.

Table C-43 Standard IGX Cables Available From Cisco

Model	Description	Usage
5608	T1, pigtail to RJ48	CSU to telco demarc
5614	T1/M15-M15 turnover	E1 trunk to CSU
5616	T1/M15-M15	
5680	BNC-DB-15	E1 trunk
5685	T1/M15-M15 turnover, Y-cable	E1 trunk redundancy
5630	V.35/M34-F34	Subrate trunk or data circuit
5636E	V.35 Y-cable	Subrate trunk or data circuit redundancy
5645	EIA/TIA-422/X.21 adapter-DTE	IGX is DTE
5646	EIA/TIA-422/X.21 adapter-DCE	IGX is DCE
5644	EIA/TIA-422 Y-cable	Subrate trunk or data circuit redundancy
5695	X.21/DB-15 Y-cable	Subrate trunk or data circuit redundancy
5620	EIA/TIA-232/M25-F25	Control port to control terminal, StrataView Plus, or external window device
5621	EIA/TIA-232/M25-M25 special	Control or Aux. port to modem
5625	V.35/M15-F25	LDI8 (DCE) to data device
5626E	V.35/M15-M25	LDI8 (DTE) to data device
5629	EIA/TIA 232/M15-M15, Y-cable	LDI redundancy

Note Most cables listed as T1 can also be used for E1 service.

Note Transmit direction is towards the “Y” trunk.